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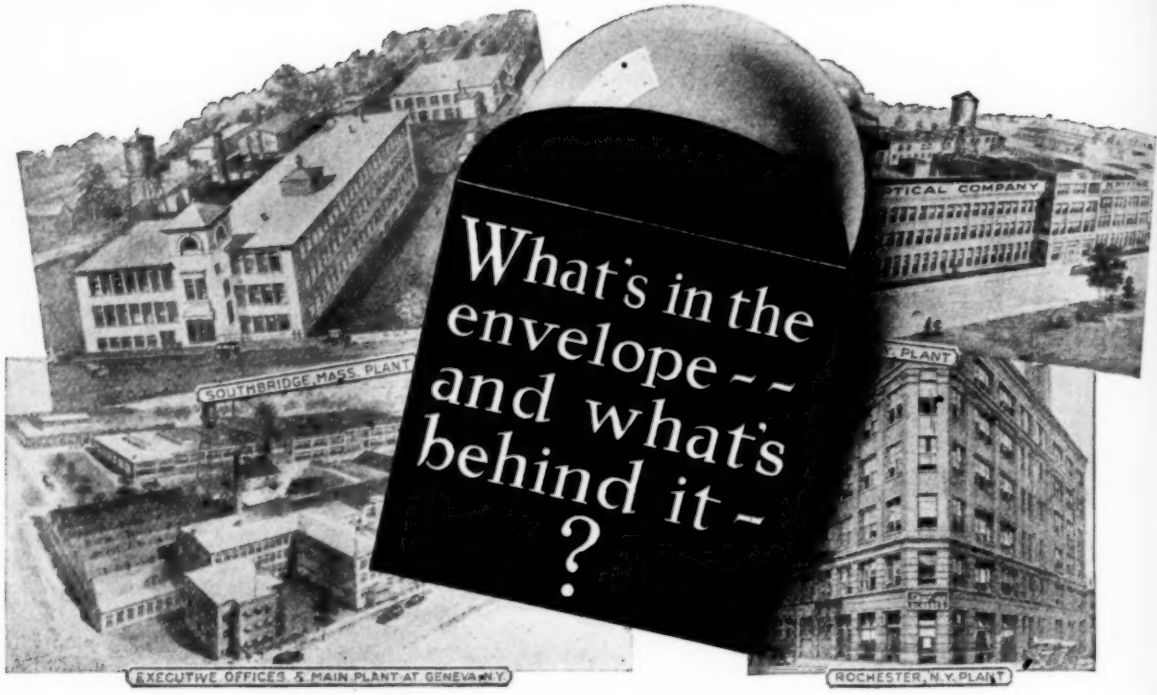
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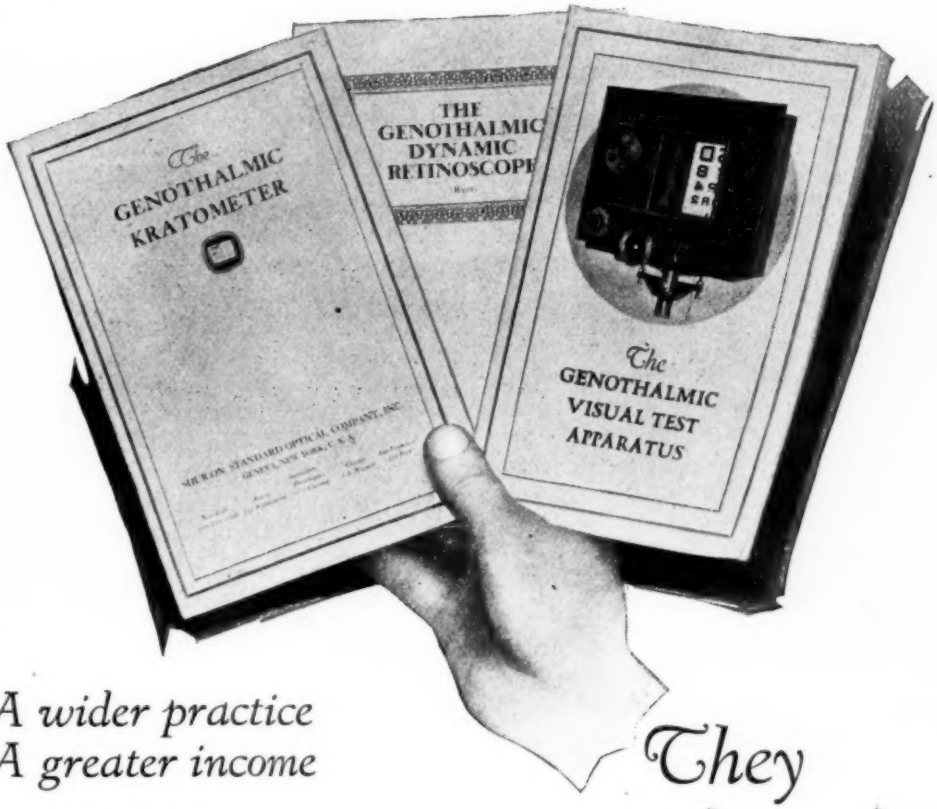

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AMERICAN JOURNAL OF OPTOMETRY

Vol. 3 DECEMBER 1926 No. 12

THE PATHOLOGICAL ACTION OF LIGHT UPON THE RETINA*

Stewart Duke Elder, B. Sc., M.D., F.R.C.S.

London, England

The question of the pathological action of light upon the retina has given rise to much speculation and controversy, and even today our knowledge of many points can by no means be said to have passed beyond the stage of uncertainty and conjecture. It is a subject which not only presents many interests in the fields of pure science and applied medicine, but is of importance industrially and from the point of view of general hygiene.

1. The Energy Incident on the Retina

(a) The Nature of the Light Incident on the Retina.—The nature of the light incident on the retina is determined by the transmission and absorption of all the ocular media. In the upper part of the spectrum in the region of the infra-red, the researches of Hartridge and Hill and Vogt have shown that above wave-lengths of 12,000 Angstrom units the energy which reaches the retina is practically negligible in quantity. Thereafter the transparency increases rapidly, until at 7,000, at the commencement of the visible red, 94 per cent of the incident energy is transmitted through the ocular media and falls upon the retina. From this point the media may be considered transparent until the lower part of the visible spectrum is reached; here, in the ultra-violet, the commencement of absorption is determined largely by the lens, the albumoid of which is the most powerful absorbent in the path of the light. Spectograms show that the dividing line here varies with that of the isolated lens, being some 200 A.U. above it (Brucke Schulek, Hallauer, Shoji); absorption in quantity commences at about 4,000 in the adult and the more recent determinations indicate that light of wave-lengths as low as 3,300 reaches the retina (Shoji). Apart from a considerable variation with the intensity of light used, this limit varies largely with the individual; it is raised in age and in the cataractous eye, and in the child the retina receives in appreciable quantity rays well within the limits of abiotic activity (Schanz, Graham). This considerable transparency persists for some time; thus Shoji found that in the infant the lens transmitted light of wave-lengths 3,050, at 17 years 3,038, and at 23 years of age, 3,125. The number of investigators who have examined human lenses is small and the question cannot yet be considered as finally established, but from the information we have it would seem that the human eye is more transparent to the shorter spectrum than that of most laboratory animals. It is of interest to note that in nocturnal animals, as the owl, the eye media transmit the ultra-violet down to 3,000.

The limits of transmission in this region of the spectrum may also be deduced from the observation of the lower limit of retinal visibility. The upper end of the spectrum does not lend itself to investigation by this method since, while the average person cannot appreciate (as red) waves longer than 7,500, and the maximum limits recorded are 8,350 (Helmholtz) and 8,400 (Hertel), we have seen that waves of 12,000 reach the retina; 80 per cent of the infra-red energy falling upon it is in fact invisible (Vogt). There is good reason to believe, however, that all the shorter waves which can penetrate the media are appreciated visually. The sensation produced has been variously described as indigo or silvery blue (Helmholtz) or silvery gray (Sekulic, Sauer), but the writer prefers to agree with Birch-Hirschfeld in describing it as a lavender gray. It may be that the sensation is due to fluorescence in the retina, although the sharpness of the lines would seem to negative the suggestion; but whether it is or not, the nature of its produc-

tion does not affect the point at issue. Flourescence in the lens must, however, be eliminated, as thereby short waves are transformed in part into longer waves, which latter might readily reach the retina, while the former were absorbed. Through neglect of thus taking the precaution of defining retina visibility as the perception of a real spectral line free from fluorescence, many observers are in error (Helmholtz, Edridge-Green, etc.), but the majority have put the limit with the usual intensities of illumination at about 3,500. Glancy, however, who took minute precautions against fluorescence, using a very high-tension spark as source, states that, although below 4,000, the spectral lines appear much fainter than the spectogram indicates, yet the 3,170 line is plainly visible. The limit varies with age, only one in twelve individuals above 50 years being able to see below 3,950 (Widmark), while in those in whom the lens has been extracted the limit is lowered considerably, both in wave-length (de Chardonnet) and in visual threshold of intensity for the same wave-length (Birch-Hirschfeld).

We may take it, then, that the retina is reached by practically all the waves between 4,000 and 7,000 (the visibles), and by a part of those between 7,000 and 12,000 (infra-red), and between 4,000 and a limit varying about the region of 3,200 (long ultra-violet).

(b) Concentration of Energy at the Retina.—In its passage through the ocular media to the retina a portion of the energy incident on the eye is lost, partly by the specific absorption of the media themselves and partly by dissipation due to their optical heterogeniety. Calculating from the extensive data of Aschkinass the loss by absorption has been computed by Luckiesh to be 30 per cent of the total for sources of the nature of the usual artificial illuminants and the sun, which may be considered to be radiometrically equivalent to a black-hot body at 5,000 degrees C. absolute. The loss by dissipation, made up of reflected, dispersed and aberrated rays, may be taken as 10 per cent. Counteracting these two influences, the refraction of the optical system of the eye concentrates the energy to a point on the image on the retina of the emmetrope, a concentration which, when high intensities are involved, may readily produce pathological effects here while leaving the structures in the anterior eye unaffected. In contradistinction to what we have seen to obtain in the consideration of the energy distribution in the lens, since the retinal image of a large body is itself large and widely spread out, for the same total intensity of radiation, the greater the extensity of the source, the smaller the energy concentration at the retina; the main danger to the retina, therefore, lies in sources subtending a small, solid angle and radiating with high intensity—e.g., the sun.

2. Pathological Effects

Pathological effects caused by light upon the retina may occur in one of three ways: (1) By over-stimulation and consequent impairment of the physiological mechanism of vision; (2) by thermic action, and (3) by abiotic action.

Since the infra-red rays do not excite the physiological mechanism of vision they cannot over-stimulate it. Any pathological effects which the visible rays (those between 7,000 and 4,000 A.U.) may cause in the functioning of this mechanism are difficult to assess in the present state of our knowledge and the old conception of retinal "fatigue" as used by Helmholtz and the earlier writers requires modification. When the *dark adapted eye is exposed to light, the light induces a new mechanism of functioning—photopic vision.* There is evidence that moderate exposure to bright light increases the retinal excitability; but after exposures of the light-adapted eye to high intensities of white or colored light, the excitability to that light is diminished and that to the complementary color is enhanced by the process of induction. None of these effects can fairly be called pathological. Prolonged and intense exposures, however, produce changes which, if not definitely of this nature, closely border upon it (Burch) and may be taken to indicate a *"physiological fatigue,"* using the term with prejudice; while, by measuring the critical frequency for the elimination of flicker, Grunbaum has brought forward evidence of a true "optical fatigue." These, however, are only ex-

treme experimental cases, and for all practical purposes retinal fatigue does not exist and the ordinarily visible spectrum may be taken as exerting no pathological effect upon the physiological mechanism of the retina, although, as will be seen, these rays can produce definitely pathological effects in another way (by thermic action). Excessive light, especially if the peripheral retina is largely stimulated, may also produce the phenomenon of dazzle, by which the sensation is prolonged after the stimulus is withdrawn. The ease with which "fatigue" can be elicited varies with the color of the light used (Wanach), being least for the more refrangible rays; similarly, the duration of the dazzle sensation varies with the color, red passes off first, then green, blue and lastly violet. Excessive contrasts also of light intensity exert a deleterious effect upon vision, a factor which is largely responsible for the unpleasant sensation of glare.

Those rays below 4,000—that is, the longer ultra-violet—produce a most unpleasant visual effect, as is experienced on looking directly at a bare arc or at a mercury-vapor lamp. The former, with its large proportion of highly luminous waves, cannot easily be looked at for long. Fixation of the mercury-vapor lamp for two minutes produces at the time and for a considerable period afterwards an annoying and uncomfortable effect visually and physically, and a curious general feeling of weirdness and uncanniness. It is difficult to appreciate details and a central luminous fog floats before the eyes which may persist for some time or an absolute or relative scotoma develops. This central fog diminishes the visual acuity considerably; it tends to float about and, curiously, may sometimes be dodged when the visual acuity appears almost normal for a moment. The lack of fixation which it induces, with the consequent effort to maintain it, seems largely responsible for a feeling of fatigue which quickly develops. Erythropsia ("red vision") readily appears after removing the eyes and persists up to two minutes and is usually followed by a distinct xanthopsia ("yellow vision"). For some considerable time afterwards there is a marked diminution in the power of adaptation, vision in the dark is lowered, night-blindness virtually coming on, and in the sunlight everything takes on a gray tint. Erythropsia is a condition wherein everything seems to be tinged with red. It occurs after exposure of the retina to intense light, particularly to light rich in the shorter spectral waves, as, for example, after looking at an arc or after exposure to a flash of lightning or to the light reflected from a snow-field. It occurs more readily when the pupils are dilated and is especially common after cataract extraction and sometimes occurs normally on waking first thing in the morning. It may last a very variable time and the tint of redness varies.

To be distinguished from true "photo-erythropsia" is a similar condition which is said to occur as a neurosis (Wydler), as also is the red vision after a trauma when the eye is filled with blood, or the red tinge which sometimes comes over black print when reading with strong lateral illumination—a phenomenon which is caused by the light passing through the sclera and the blood-containing choroid.

The nature of erythropsia has not definitely been cleared up but it is more probably a subjective phenomenon rather than a pathological condition and depends upon induction. The earliest theories of its origin may be dismissed—the light passing through the lids and becoming colored with blood (Snellen, Koster) and the entoptic vision of the visual purple (Fuchs). Since it is more readily produced by short-waved light and since it occurs especially after cataract extraction when that light has better access to the retina. Birch-Hirschfeld and Schanz advanced the theory that it was due to ultra-violet rays. Vogt has, however, shown that the phenomenon can be produced by light of any wave-length, that the most effective wave-lengths were 5,000 to 5,700 A.U., that it occurred readily when the ultra-violet was filtered off, and that it could in no circumstances be produced in the normal eye with ultra-violet light alone. Brucke showed that the retina was normally adapted for red and the findings of Burch have already been mentioned—that after "fatigue"

of the retina, recovery comes in the order, first red, then green and lastly blue. Therefore, on stimulating with mixed (white) light, the red phase of the negative after-image will predominate (Wydler), and when the stimulating light predominates in the shorter blue and violet waves, owing to the unequal "fatigue" of the primary color sensations, the red phase will be much more pronounced. Such an explanation will account for the partial erythropsia which occurs on unequal retinal stimulation (Purtscher) and paves the way for an explanation of the xanthopsia which so often follows it. In the cataractous eye it is the long red waves which get through the opaque lens in the highest proportion, the short blue and violet are largely dispersed; the retina in these cases is, therefore, more than usually red-adapted, and when the cataract is extracted and the retina flooded with short-waved light, an additional element—the "fatigue of disuse"—affecting the lower spectrum will further intensify the red after-image.

Apart from these physiological effects there is no evidence that incident light has any specific effect on the retina as on the other body tissues beyond a thermic or abiotic action depending on length of wave.

Thermal Effects.—The greater part of all energy incident on the retina is absorbed by the pigment in its posterior layers and degraded into heat. Thermal lesions are, therefore, easily produced experimentally and have been studied in animals by a large number of observers—Czerny (1867), Deutschmann (1882), Widmark (1892), Herrnheiser (1896), Aubaret (1907), Birch-Hirschfeld (1912) and Verhoeff and Bell (1916). When the lesion is on the disc there may be an intense hemorrhagic retinitis, due to thrombosis of the central vessels. Elsewhere on the retina, corresponding to the site of the image, the lesion appears as a small red spot, due to choroidal congestion, localized and sharply defined, demonstrating the necessity for the attainment of a critical temperature to effect tissue destruction. Microscopic examination shows that the greatest severity affects the pigment layer where the heat is absorbed; the cell of this layer show fragmentation and vacuolization of the cytoplasm and finally break up altogether and disappear, leaving only the pigment. Thereafter follow in intensity the layers in order as they are affected by conduction from the pigment layer: the rods and cones, which become swollen and granular, and the chorio-capillaris where there is intense local hyperemia, with extravasations of blood. The nuclear layers, the ganglion layer and the nerve-fiber layer are only affected when the deeper layers are entirely disintegrated and are represented by pigment alone. Some days later the retina is seen to be entirely disorganized or to be fixed by heat coagulation, while after some months the retina is represented locally by neuroglia containing pigment and the choroid by a vascular fibrous tissue.

Abiotic Action.—Since only the longer ultra-violet rays can reach the retina, it would seem improbable that any marked abiotic effect could be produced, but although several observers have failed to obtain them (Czerny, Deutschmann, Ogneff, Bach, Verhoeff and Bell), definite abiotic lesions have been described by Strebel, Kiribuchi, de Ridder and Birch-Hirschfeld. The lesion, in contradistinction to that caused by heat, attacks primarily the most anterior layers. Chromatolysis and vacuole formation has been described in the ganglion cells and loss of chromatin in both nuclear layers, while the deeper layers are unaffected; Mettey has described athophic changes in the optic nerve. The changes observed by the writer have always been very slight, so slight as to seem within the physiological variation of the normal rabbit's retina after being subjected to cutting and staining. The exposures given were, however, never more than 30 minutes' duration, while Birch-Hirschfeld, who has described these lesions most confidently, subjected his animals to radiations lasting for periods up to six hours. This difficulty in producing abiotic pathological changes here agrees with the negative findings of Verhoeff and Bell, who experimented on monkeys and in one case on a woman the day before excision of the eye for carcinoma of the lid. It seems reasonably certain, therefore, that the retina is adequately protected by the ocular media from abiotic rays under all ordinary circumstances;

but it is probable that extreme exposures for long periods may injure it and the possibility of ultimate damage from exposures of less extreme intensity but over periods lasting many years is not without the bounds of possibility. The above pathological changes are obtained much more readily and to a much more marked degree in the lensless eye; experimentally they are produced in the aphakic rabbit after exposures which leave the retina of the normal animal unaffected (Birch-Hirschfeld, Schulek).

Clinical Occurrence of Retinal Lesions

Sun Blindness.—Visual disturbances from looking at the sun have been known and recognized for a very long time. Plato refers to them in his Phaedo; Galileo, looking at the sun with his telescope, injured his eyes; and Galen describes the symptoms in de usu Partium. Reid, in 1761, appears to have recorded the first clinical description and Dufour, in 1882, was the first to describe accurately the ophthalmoscopic appearances of the lesions.

The sun may be considered from the radiometric point of view as a black-hot body at 5,000 degrees C. absolute, and the energy available in its radiations has been computed to be about 1,000,000 erg-secs. per sq. cm. at the earth's surface (Verhoeff and Bell). If the pupil is strongly contracted to about 2 mm., as it would be on observing it directly, about 3 per cent of this energy will enter the eye, and since slightly over 30 per cent of that entering is lost in its passage through the eye, the energy available at the retina will be of the order of 20,000 erg-secs. per sq. cm.; if the size of the image is 0.15 mm., this will entail a concentration of energy here of the order of 113,000,000 erg-secs. per sq. cm.—quite enough to produce a severe lesion in a very short time. Ordinarily, when we look at the sun directly we are only protected from injury by the fleeting duration of the glance and by the great lack of fixation which distributes the energy accumulation at any one part of the retina; only on unusually determined fixation is injury sustained. Every eclipse has brought to light a number of such cases and the name, "eclipse blindness" usually applied to the condition is, therefore, appropriate.

The greater part of the infra-red in the solar spectrum is absorbed by the moisture of the atmosphere and the ultra-violet moiety of the total energy reaching the earth is comparatively small. Experimentally, the typical lesions of eclipse blindness have been produced by filtering out the infra-red by a layer of water (Deutschmann) or of a solution of ferrous sulphate which is strongly adiathermic, and also by eliminating the ultra-violet below 4,000 by the interposition of Schott's heavy flint glass; while uviol glass, which obstructs the visibles but allows the passage of ultra-violet, affords complete protection (Best). The lesion is therefore due mainly to the luminous waves. It is to be remembered that the maximum of the solar energy intensity is near the shorter visibles in the blue-green (4,700-5,000 A.U.), and that therefore where the sun is the source, the greatest energy intensity and therefore the greatest heat effect is produced by these rays.

The lesion is a purely thermal effect, corresponding to that already described as obtained experimentally. The subjective symptoms are a diminution of visual acuity, sometimes to 6/60 or less, but usually to about the level 6/12; the perception of a diffuse cloud before the eyes, which often shows rotatory movements and may be worse in bright light; a scotoma; and often metamorphopsia. The scotoma is central, is usually absolute but often relative, or may be initially absolute and later become relative, or absolute centrally surrounded by a ring zone of a relative nature; it does not accurately correspond to the image of the sun owing to the lack of fixation spreading the affected area irregularly; in some weeks it tends to contract, but it often is persistent. Erythropsia occurs rarely. Ophthalmoscopically there is originally a small red spot at the macula due to choroidal congestion, which may be accompanied by general hyperemia, oedema and hemorrhages. Small irregular pigment spots frequently remain at the macula, indicating definite and permanent destructive lesions, while macular holes have been observed (Lasarev). Rare complications are obstruction of the central vessels (Batten, Walker), hem-

orrhagic retinitis (Leber, Bokenham), retrobulbar neuritis (Collins, Menacho), and optic atrophy (Ulbrich).

Similar symptoms with similar retinal changes have been described as occurring in a milder form in bright weather when the sun is not directly regarded, as the case reported by Lawson wherein they developed after a day's golf and were followed by permanent fine macular spots. Dark people are more susceptible than fair, owing to the larger amount of absorbing pigment in the former, while hypermetropes show a much higher incidence in the literature than those of normal or myopic refraction. The concentrating effect of strong convex spectacles in the hypermetrope may predispose to injury, and symptoms have been reported after the prolonged use of field glasses on a sunny day (Lawson).

Whether or not prolonged exposures to light lasting over years have an injurious effect on the retina by a cumulative action is an open question and one which, by its nature, is very difficult to answer with any degree of certainty. It is improbable that any such effect could be due to a thermal lesion, as is eclipse blindness, for at any one time a critical temperature must be attained to produce any destructive effect and with intermitten exposures the temperature effect is nullified in the intervals of cooling and a cumulative action, therefore, cannot be obtained. Diffuse daylight and all ordinary illuminants, therefore, can have no ultimate thermal effect on the retina. With the short rays, however, the case is different, since the latent period of abiotic action extends up to about 24 hours and a cumulative action can, therefore, be produced by exposures on successive days even although separated by intervals of sleep. We have seen that the experimental production of such lesions is very difficult, owing to the high degree to which these rays are absorbed in the media of the eye before they can reach the retina, but the factor of small amounts of damage accruing over many years is certainly one to be considered. Thus, accompanying the photophthalmic symptoms met with in snow-fields, Widmark records the occurrence of amblyopia, and Birch-Hirschfeld a scotoma for red and green, and ophthalmoscopically a hyperemia of the retina and disc may occur (Reich). Van der Hoeve has suggested that ordinary daylight, acting less intensively and over indefinitely long periods of time, may be the cause of senile macular degeneration. His thesis is based largely on the evidence that his statistical studies show that this retinal disease appears in its incidence to be antagonistic to cataract; the short waves of light (he argues) cause cataract by impairing the nutrition of the lens through an indirect effect on the ciliary body, and the lens having become less transparent, the retina is protected from the short wave-lengths and macular degeneration does not readily develop; if, however, the lens remains transparent, the actinic rays pass through and are thus able to exert a harmful effect on the retina. Gjessing has recently confirmed van der Hoeve's statistics, but although it may be considered as probably established that the two diseases do not often occur together, statistical evidence of this kind is, when taken by itself, somewhat unconvincing and very often lends itself to misinterpretation. The most that can be said at the present time is that the matter is still open and the theory certainly unproven.

Industrially, while all intense illuminants give rise to the subjective symptoms already mentioned, the cases of actual retinal injury are rare. After exposure to arc lights and in electric welding, diminution of vision, contraction of the visual field and scotomata are relatively common, while erythropsia and xanthopsia occur more rarely; objectively there have been reported oedema of the retina (Little), pallor of the disc (Valois) and macular changes (Lubinski). These findings are, however, exceptional and the naked arc can be fixed for several minutes without any damage being done to the retina beyond temporary impairment and derangement of vision. The flash of the short-circuiting of a high-tension current almost always gives rise to the characteristic visual disturbances which are usually temporary, but on occasion have remained over indefinitely long periods of time; haziness of the disc margins (Terrien) and

macular (Haab) and chorio-retinal changes (Uhthoff, Kramer, Bettremieu, Knapp) have been described. These latter appear as small pigmented areas and are without doubt the cicatrices of thermal lesions caused by the longer wave-lengths of the very wide range of radiations emitted by these sources. Similar thermic retinal lesions after exposure to a lightning flash have been reported by Le Roux and Renaud and Oliver.—

* "The Eye, Ear, Nose and Throat Journal."

OCULAR DOMINANCE AND THE CHROMATIC TEST

Joseph I. Pascal, B. S., Opt. D.

New York, N. Y.

In considering the subject of suspenopsia, on which a good deal has been written lately, one is naturally driven to a consideration of the subject of the dominant eye. On both these topics Dr. McFadden has shed much light in his interesting contributions. However, his discussion in your September issue of a previous article by me on the chromatic test for the dominant eye, is subject to correction.

Dr. McFadden objects to the lining-up-the-pencil method for determining the dominant eye because of the unavoidably misleading element of right or left handedness entering into it. In this objection I fully agree with him. In fact I mentioned this very objection to the pencil test in my original article. I briefly discussed this test because it is a well known and often used test and I wanted to show its shortcomings in favor of the other test. The chief reason, amongst others, for disapproving of this test in favor of the chromatic test was the element of right or left handedness interfering with its accuracy.

But Dr. McFadden's voicing the same objection to the chromatic test is not at all justified. For the red disk is not handled by the patient but by the examiner. In my article, I think I made it very plain. I said: "I then slip the right disk over the right eye, etc." The objection to what is said, "my handing disk to consultant" is due, no doubt, to a hasty reading or misunderstanding of my article.

The objection to the chromatic test because it is a subjective test is, of course, no stronger than similar objections that can be raised to all subjective testing. If an objective test could give us the same information as the subjective test we should prefer the objective test. But, I believe, no objective tests will ever displace our subjective tests. They will supplement them but not displace them. This is so especially when we wish to investigate those phenomena of vision which are not directly concerned with the eye as a purely focusing mechanism.

I mentioned the patient's reaction to the test as a merely incidental observation. How far the patient is to be taken into the examiner's confidence during an examination is a matter of individual judgment and discretion. And this applies equally to subjective and objective testing. Sometimes it may be advisable to inform the patient of the significance of a certain test, sometimes it is best to leave him in ignorance. Many excellent practitioners habitually tell the patient the meaning of their various tests. But this is purely a matter to be decided by the individual practitioner and patient, and has nothing to do with the test as a whole. Personally I am inclined more towards making the tests with as little explanation to the patient as possible.

Incidentally, Dr. McFadden's test with the card and hole, is, in my opinion, not so good as the chromatic test. In the card test the patient again uses his hands, both hands, to hold the card. As he can look through the hole with only one eye he has to move it opposite one or the other eye. Is not this movement influenced by what-

ever dominance there may be of one hand over the other? Furthermore, this test at best reveals what we may properly call the directing or aiming eye, since only one eye can be used. This may or may not be the same as the dominant eye.

To clarify matters and to avoid useless discussions and arguments due solely to a misunderstanding of terms I will briefly define my conception of the dominant eye. When both eyes are used, simultaneously viewing and fixing the same object, and sending their stimuli to the visual centers where the two stimuli are blended into one mental impression, then that eye whose stimulus affects consciousness more strongly and which therefore exerts a dominant effect on the single mental impression resulting from the blending of the two stimuli, is the dominant eye. It is the eye which sends the stronger kick of the two which are simultaneously sent to, and received by, the cerebrum. Therefore, to determine the dominant eye it is necessary to send two simultaneous visual stimuli from both eyes to the brain and determine which of the two stimuli contributes the greater element in the resulting fusion. And, in general, we find that the mind does react more powerfully to one of the two simultaneous stimuli. And no test for the dominant eye, except the chromatic test, can determine the relative intensity of the mental reaction to one or the other of the two simultaneous visual stimuli.

It has been stated by some investigators that ocular dominance frequently changes from one eye to the other. It may do so alternately, sometimes every few seconds or minutes. This is probably in the interests of visual economy, and modern psychological research points to this probability. This alternating dominance is beautifully shown by the chromatic test. In several cases the color of the spot of light as seen with the naked eye and the red disk over the other seemed to wax and wane when looked at for several minutes. I have observed the same phenomena several times in my own eyes. The spot light will appear first as a deep red then grow pale then regain its color and thus alternate. Or it may appear first as a pale red then grow deeper red and alternate in regular or irregular intervals. This clearly shows the visual ascendency now of one eye now of the other. The possible objection of color fatigue can be readily overcome.

I am tempted to say a few words at this time on the subject of suspenopsia. When I started this article I merely wanted to touch upon and confine myself to a defence and elaboration of the chromatic test. But now that the writing spirit is upon me I am going to take a shot at my friend McFadden. I know he is game and square, else I should have refrained, especially after the chummy little letter just received from him.

Suspenopsia, as I understand it, is the extreme of monocular dominance. That is one of the two simultaneous, macular, visual stimuli completely dominates consciousness. The other stimulus is completely ignored. It is akin to what mathematicians call the limiting value, it is the end result of monocular dominance as amaurosis is the extreme condition of amblyopia. To use rough percentage figures, let us rate the total fused mental impression resulting from the two stimuli as 100%. Then, if there is no visual dominance of one eye over the other, each eye contributes 50%. If there is visual dominance then the dominant eye contributes more than 50%, say, 60 or 70% depending upon the extent of dominance. In suspenopsia, one eye by its macular stimulus would contribute 100% while the other eye, by its simultaneous, macular stimulus, would contribute zero.

That such a condition is possible, I doubt very, very much. In fact it seems impossible without immediately leading to strabismus. In cases of alternating strabismus now one eye now the other takes up fixation. But here one eye always deviates and there is no macular image of the object fixed in the deviating eye. The macular image of some other object is ordinarily completely ignored. In many such cases, where the images of the same object are artificially brought to the two maculas, there seems such an aversion to the mental blending of the two that one eye will turn to displace its image. This has been termed an inherent aversion to fusion and single binocular vision. For the above and other reasons I do not believe it pos-

sible that when there are two seeing eyes, simultaneously and macularly fixing the same object, the stimulus from one eye can be completely suspended from consciousness. This might possibly occur in cases of hysteria where almost everything is possible.

Dr. McFadden's tests for suspenopsia are not tests for that at all, under my understanding of the term. By using different images, as the streak of light and the spot of light, or one macular and one forcibly displaced non-macular image, the watching of the two images is more a matter of attention than of sight. It is a test, perhaps, to see how attentive a person can be to two simultaneous visual impressions differing in kind or in position. In fact in his own discussion of the subject the author repeatedly uses the terms attention, "compelling attention," "concentrated attention," "divided attention," etc.

These remarks on suspenopsia are thrown out incidentally for whatever enlightenment they may bring on the subject in future discussions. I may not find the time to contribute any more to such a discussion beyond what I have written now. However, I hope to have cleared the objections to the chromatic test and to have thrown more light on the unique nature of that test. This, in fact, was the real purpose of my writing at this time.

ESOPHORIA AND AUTO-INTOXICATION

A. S. Anderson, Opt. D.

Williston, N. Dak.

During the past year I have had three very interesting cases that are classed in my prescription records as "stubborn esophores."

A. Young man, 23, office worker. Eyes tired easily after continued close-work. Was wearing O. D. —3.50 D. Sph. ⊃ —0.50 D. Cyl. axis 15, and O. S. —4.00 D. Sph. ⊃ —1.00 D. Cyl. axis 180, which was found to be substantially correct giving 20/30 vision in each eye and 20/20 minus, binocularly. Patient exhibited three pairs of glasses that had been fitted within the past year and one-half—none of them giving comfortable near vision, so the patient said. Esophoria at far 4 degrees, at near 1 degree. Abduction 3 degrees and adduction 24 degrees, O. U. Prescribed an extra pair of glasses for reading adding plus 1 spheres to the distance correction and 20 days' office treatment with prisms base in. The reading prescription immediately improved conditions "about 50 per cent" in the terms of the patient. The daily muscle treatments, having no appreciable effect in 20 days, were discontinued. A blood pressure test showed a reading of 5 points less than normal. The patient was then subjected to a thorough cross examination on personal hygiene. He stated that he often felt tired and languid and that his "stomach" bothered him occasionally, having to resort to laxatives on those occasions to secure bowel evacuation.

My conclusions were that A was suffering from auto-intoxication. I placed him on a non-toxic diet consisting mainly of fruit, whole wheat products, and milk. In a week he reported that his general condition had greatly improved and also that near-work was now comfortable with the reading glasses for indefinite periods.

Upon my request he returned three months later. He still found it necessary to use the reading glasses although the esophoria was now reduced to 3 degrees. He reported that near-work was entirely comfortable, and his bowels had emptied two or three times a day, except on the few occasions that he had yielded to temptation and resumed his former eating habits.

B. Man, age 35, theatre manager. Same symptoms as in case A except that symptoms were more marked. Near-work was impossible for more than fifteen minute periods. Patient brought six pairs of glasses to the office and stated that he had as many more pairs left at home if I cared to see them. Was wearing O. D. +4.50 D. Sph. ⊃ +1.75 D. Cyl. Axis 90 and O. S. +4.00 D. Sph. ⊃ +2.25 D.

Cyl. Axis 90, which was found to be substantially correct. Esophoria at far 5 degrees, at near 2 degrees. Abduction 3 degrees, adduction, 20 degrees, O. U. Prescribed an extra pair for reading with plus 1 spheres added to distance correction, and 20 days' office treatment with prisms base in. Patient reported that with the reading glasses near-work could now be indulged in from ½ an hour to an hour, depending on how he "felt." In this case too the exercises did not help so were discontinued. Blood pressure was found to be subnormal 6 to 8 points. Upon further questioning it was found that patient had been suffering from digestive disturbances for ten years and had been examined at the best known medical clinic in the United States no less than seven times during that period. The diagnosis had always been the same: "There appears to be nothing organically wrong with you."

I concluded that the lack of tonous in the external recti (esophoria) was due to auto-intoxication and the digestive disturbances to the slow movement of the intestinal contents (intestinal stasis). I wished to place him on a regimen that would eliminate the toxic materials now in his body and guard against further self-poisoning. My plan was to prescribe daily irrigation of the whole colon (high enema) for a period of two weeks, followed by a non-toxic diet similar to that prescribed for A.

Although B conceded the rationality of the treatment I suggested, he demurred from undertaking it when I insisted that he must also abandon the cigarette habit. He states that he is getting along "better than he ever did" with the help of the reading glasses. He wears the reading glasses all the time although they blur distance vision to 20/30 minus. My belief is that he endures this blur because the extra plus relieves the esophoria somewhat by relaxing convergence.

B is one of those hardy persons who can endure chronic constipation (and the resultant auto-intoxication) due to the fact that the natural resources of the body have not yet broken down. Since he has had a great deal of medication without results, and since he accepts the theory that health is the result of biologic living but lacks the will to adopt it; I feel confident that he will be back for further treatment.

C. Young man, 26, office worker. Eyes tired easily after continued near-work. Was wearing O. U. —037 D. Sph. ⌒ —0.37 D. Cyl. Axis 180, which gave him 20/20 vision, binocularly. Esophoria at far 5 degrees, at near 2 degrees. Abduction 4 degrees and adduction 30 plus, O. U.

Since I had by this time lost my faith in the potency of muscle exercise to increase the abductive power no treatments were recommended. The distance correction was unchanged and a pair 6 +0.25 D. Sph. ⌒ +0.25 D. Cyl. Axis 90, were prescribed for close work. After two weeks of trial patient reported that reading glasses afforded but little improvement.

This patient exhibited a subnormal blood pressure and other marked symptoms of toxemia. He had tried many methods for improving his general health, including medication, two minor surgical operations, chiropractic adjustments, and osteopathic massage; all of them proving ineffectual. He stated that his bowels were never emptied oftener than every second day and his system had become immune to laxative drugs about a year previous.

It was not necessary for me to urge him to accept my views regarding the benefits of right living (which is for the most part right eating), since he had become a convert to biologic living a year before following a complete breakdown in health. He was now living on a diet that should have afforded normal passage of the bowel content in the normal person. And so it probably would in him, but for the two years of constant medication that had almost completely demoralized the natural intestinal function.

In addition to continuing his non-toxic diet I prescribed 3 teaspoons of plantago psyllium to be eaten with each meal. (According to the Life Extension Institute, "Plantago-Psyllium seeds combine the stimulating qualities of agar-agar or bulky vegetables and the lubricating qualities of mineral oil, as they become mucilaginous on absorbing moisture. They thus lubricate the bowels besides adding to the bulk of the feces to a far greater degree than agar-agar." These seeds are not a drug but an auxiliary food imported from Europe. They can be

used indefinitely without harm to the patient.)

After two weeks the patient reported that his bowels had emptied twice a day since the fourth day and that he felt like a new person. He can now do close-work comfortably for hours without glasses, using the distance glasses only when clear vision at a distance is necessary. The esophoria has reduced to 3 degrees.

The phenomenal results in this case, made possible largely through the intelligent co-operation of the patient, were extremely gratifying.

* * * * *

Auto-intoxication may be defined as self-poisoning from the large intestine and is the result of intestinal stasis (constipation). Common symptoms are coated tongue, cold hands, cold feet, lack of color in face, jaundiced eyes, abnormal blood pressure (subnormal in youth and greater than normal in middle age), occipital headaches, and most typical of all that tired worn-out feeling.

The constipation may be latent the patient stating that he is not a sufferer from this condition. One bowel movement a day does not prove that stasis is not present since it is possible that the bowel content that is discharged one day should have been discharged the day previous. Dr. Kellog of Battle Creek, Michigan, world famous surgeon, is authority for the statement that one bowel movement a day is not enough but constitutes a condition of chronic constipation.

That the treatment of auto-intoxication lies outside the sphere of the optometrist is pretty generally conceded. However, the satisfactory treatment of the esophore who is a victim of this condition is a problem that concerns optometrists vitally, since eyestrain may be the patient's only symptom. My own experience has been that the average medical practitioner does not consider auto-intoxication seriously. If referred to him the esophore would probably be prescribed laxative drugs that would only tend to aggravate the condition. The average medical practitioner does not have the time or the inclination (assuming that he has the knowledge) to prescribe a corrective diet or other effective natural measures, his time is devoted largely to the most profitable branch of his profession, surgery.

So with the welfare of the patient at the first consideration the optometrist should reflect carefully before referring his patient to another, if he is capable of giving the advice necessary for corrective treatment himself. Personally I do not advocate the treatment of esophoria due to auto-intoxication by the optometrist unless he thoroughly understand his subject. Much harm can be done by the practitioner who has but a superficial understanding of food science and the human mechanism. In this regard the old axiom "a little knowledge is a dangerous thing" is quite applicable.

REPORTED CASES

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Eye Strain as the Cause of Headache

Under the above heading in a recent number of an ophthalmological publication, Dr. H. Maxwell Langdon (1) has much to say to his colleagues about refraction. Both medical and non-medical, much that will be both interesting and amusing to optometrists and the more modern physicians, who are using the non-medical method of refraction; evidently with success, or else, since they have the choice of either, they would use the cycloplegic method.

Dr. Langdon comments on functional conditions—and the great variation, not only in powers of different individuals but also great variance at different times, and under different conditions, in the powers of the same individual; and that it (refraction) is not like weighing or measuring some tangible thing. Later on in his article he takes ophthalmologists to task for "throwing away the results of cycloplegia" work in their anxiety to gratify the haste of patients, who naturally wish to avoid the annoyance of

a cycloplegic: and that some were pandering to the mistaken idea of the public in the fancied necessity "to compete with optometrists." After the above comments on fractional conditions he makes this statement: "Lenses especially for the correction of astigmatism are either correct or incorrect," and then he cites a case where the correction, without a cycloplegic, was + .25 — .50 Ax. 90, when refracted with a cycloplegic, changed to + .25 + .25 Ax. 180. Optometrists who read this will smile, for they know that the above glasses were not prescribed by an optometrist, for few, if any, optometrists would be guilty of the plus and minus combination of the above non-medical prescription. Other similar changes were mentioned, but they are changes that most optometrists meet and correct every day.

We, as optometrists, have wondered for some time by what process of reasoning anyone could arrive at the conclusion that a living, changing, active organ, functioning under different conditions, could be measured when paralyzed, better than when it was active. We, as optometrists, measure first the total amount of ability of a pair of eyes, then the task that is expected of those eyes.

The best evidence that we are right is the fact that more modern ophthalmologists are using our methods, and the manner in which we are being received by the public.

It would be interesting to know to what cause or causes Dr. Langdon attributes the cases of "comebacks," since he states in his article that refraction under cycloplegia is accurate, but perhaps he does not have comebacks. Since a burned child is afraid of the fire, it is not unlikely that those cases seek relief elsewhere, and under more scientific methods, since the marvelous drops failed.

So long as optometrists recognize a patient as a human being, and so long as they remain agreed that optometry is a highly scientific profession in itself, strive to give the public the best possible services, let medicine alone, devote our time, study, thoughts and efforts to improving our methods, let the ophthalmologists highbrow us and fight this question of medical or non-medical refraction out among themselves. The fact that they are disagreed over the question is evidence that we are right in our methods. Some day optometrists will do refraction, and the ophthalmologists will do the surgery and medical treatment, and it will be a relief for an eye-weary public and a boon to humanity.

Monocular Diplopia, Due to Astigmatism

Dr. A. C. Lewis (2) reported this case. On August 22, 1925, Mr. W. T. C., aged 48, consulted him about the right eye: trouble of six weeks' duration. There was an acute conjunctivitis of this eye with a small chalazion and two small ulcers on the conjunctiva of the upper eyelid. Vision was blurred and equaled 20/60.

While taking his vision, he discovered that he had a true case of monocular diplopia in this eye. Every letter on the Snellen charts at a twenty-foot distance was doubled, the two objects appearing side by side and nearly an inch apart.

Examination of the crystalline lens showed no abnormality either in position or structure. The iris and pupil were perfectly normal in all respects.

He was refracted without cycloplegic, and glasses were prescribed as follows: O. D. +1.00 Sph. with +1.75 Cyl. Ax. 90. O. S. +1.00 Sph. Vision equals 20/15 in each eye. Since he has been wearing this correction the diplopia has disappeared and all other symptoms with it.

This is the only case of monocular diplopia caused by astigmatism he has seen. They are usually caused by a subluxated lens, lenticular changes in incipient cataract, iridodialysis or multiple openings in an iris.

Hysteric Amblyopia

Dr. Frederick Cherry (3), reports a case, of a young woman, age 23. Complained of poor sight and occasional headache. Vision was 6/8 only in each eye. Ophthalmoscope appearance normal, Retinoscope showed Hypermetropia, +.50 Sph. only in each eye; but this correction made no difference to vision. Visual fields varied, being one moment full, then restricted. Questioning revealed the fact that neighbors had told her that "her eyes looked as if they were going blind." The opinion was formed that it was a

case of hysteria, this diagnosis was later confirmed, and she was assured that she would see perfectly well in a week or two with the +.50 Sph., that were given for constant wear. A month later, reported comfort, headache gone, and vision normal.

In the absence of more complete data, as to latent hypermetropia, latent or manifest muscular imbalances, etc., the above diagnosis seems probable. It would be interesting to know which lens in our trial case is the most valuable in terms of relief afforded the patient. It seems that the little old +.50 Sph. would poll a mighty large vote.

Growth on Ciliary Body

The same writer, Dr. Cherry (4) reports in contrast to the above, a more serious case, but one in which the symptoms caused no alarm to the patient. Man age about 60 years, complained of not seeing well in right eye, for past two months, but thought it was becoming worse. Pupil small. A mydradic was used when a growth was seen on the ciliary body, just beginning to encroach on the pupillary area. Dr. Cherry referred to this growth as possibly a cancer. He was referred at once for surgical or medical treatment.

This case in the hands of a less careful examiner in all probability would have been fitted with glasses that gave the best vision, and dismissed.

Toxic Paresis of Left External Rectus

Dr. Geo. F. Libby (5), reported the case of P. H. L., male, aged 34 years. Last April the patient first noticed lateral diplopia, with inability to rotate the left eye outward. He promptly had a devitalized infected tooth extracted. There was an apical abscess, with erosion of the apex of this tooth. When first examined, on May 21, 1925, there was 32 degrees of esotropia. Vision and the fundus oculi were normal. Examination of the mouth then showed three devitalized, infected teeth and one impacted third molar that was considered suspicious. All four teeth were extracted, and the abscess cavities were curetted. In removing the impacted molar the jaw was fractured and had to be wired. Examination of the nose showed an old, bad fracture of the septum, which caused bad drainage from the accessory sinuses. Wassermann and kidney tests were negative.

On May 25th, the esotropia for distance was 24; June 1st and 10th, 20; October 20th, 28; and December 9th and 19th, 15 for distance, and 6 for near.

Each Optometrist should have several good Dental acquaintances who will co-operate with him on cases of this kind.

Partial Paralysis of Accommodation Following Mumps

Dr. Wm. H. Crisp (6) reported the following case: Girl age 9 years, who had recently been given a refractive correction for hyperopic astigmatism, moderate amount. Complained of poor vision in left eye, and dilation of left pupil. Homatropin was instilled 3 weeks previous. No drugs since. The vision with correction right and left was 20/16 but without correction the vision of the left eye was only 20/24. The right pupil contracted to light, the left did not. The near point accommodation test showed right eye 4 diopters left 2 diopters; although previously 10 diopters of accommodation had been recorded. The patient was just recovering, and was out for the first time from a very severe attack of mumps. After treatment with pilocarpin for a month the accommodation was 5.50 diopters each eye, with glasses. Patient had not been seen since.

This case should be most interesting to Optometrists, as another case for paresis of accommodation, and if mumps cause paresis of accommodation, by disturbing the other brain centers, it would in the same way cause esotropia, exotropia, hyperopia or ptosis, depending of course upon the location of disturbance.

Paralysis of Downward Version Movements and of Convergence

Dr. Warren S. Reese (7) exhibited a case of paralysis of the downward movements, and of convergence in a man, aged 22 years, first seen July 13, 1925. The following history was obtained: In January, 1923, he began to see double. This lasted two weeks, and then both lids drooped. Ptosis lasted two weeks, and when it cleared up he could not look down or see near objects. His chief trouble now is that he gets sleepy and has difficulty in walking, as he cannot look down. Examination showed slight ptosis of the

left upper lid; lateral ocular movements good: upward movements limited and down movements abolished, the patient being unable to move his eyes at all below the horizontal plane. There was no convergence power and some limitation of adduction of the right eye. Fundus examination was negative. The patient required a +2 spheric lens in front of O. D. to read 1 mm. print at 7.5 inches. With the left eye he could read this print at 9 inches without a sphere.

This seems to be a complication of encephalitis lethargica. The writer recalls two similar cases in his own practice, one a minister about 35 years of age who's downward version movements were affected in such a manner, that he was obliged to keep his head very low. Certainly a very unattractive manner for a minister. 4′ prism base up on each eye caused him to hold his head about on level. These lenses have been worn now more than 2 years with satisfaction.

Another, the wife of a physician, who was just recovering from encephalitis lethargica, with paresis of the external rectus with esotropia 28Δ. When looking straight ahead, fusion was possible, looking at a 45′ angle to the right; Refractive for distance was +1.25 Sph. She also had a right hyperphoria of 6Δ prism diopter. The following description gave much relief. O. D. +1.25 Sph. combined with 4Δ prism base down; O. S. +1.25 Sph. with 8Δ prism base out. This was worn 6 weeks with much satisfaction, at which time her physical condition was much improved. Hyperphoria had reduced to 1 P. D. Esotropia had become a phoria of 4 P. D. Prisms were discontinued, but instructions were given for distance glasses to be worn constantly.

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SPECIAL REPORTS

WANTED—OPTOMETRIC INFIRMARIES

William Smith, Opt. D.
Roxbury, Mass.

No one will dare to dispute the fact that during the last few years Optometry has made remarkable progress, both in its scholastic standards and in general practice. Optometry has ceased to be a jewelers' side-line and has assumed an entirely new aspect. The "yardstick" eye specialist who, years ago, flourished behind the jewelry counter, has been forced by law to prove himself competent, and, although we still have Optometrists who share their business with the jeweler and watchmaker, we at least feel content to know that they are responsible to the state, should they attempt malpractice.

Universities have taken up Optometry and have given it a place in the curriculum. Some confer the degrees of Bachelor of Arts, others the degree of Doctor of Optometry. The enemies of Optometry are beginning to realize their own absurdity, and before long, medical men will be forbidden to practice Optometry unless they are duly registered by the State Board of Optometry.

The success of the profession is assured. But there is one thing lacking to perpetuate his assurance. This is especially true in the lack of Optometric infirmaries. It is desirable to maintain clinics where graduates from Optometry schools can obtain practical experience.

It is true that the modern Optometry school teaches both theory and practice. The State Boards require the applicants to perform a complete eye examination, including the fitting and adjustment of frames. At the schools these examinations are performed under the direction of the teachers, and the student comes in contact mostly with cases of simple type; such as, Myopia, Hyperopia, and Astigmia.

While the clinics in their place are beneficial, the student has no access to them after he has completed his course. His place goes to the undergraduate, who in turn gives it up to his successor.

It is a well known fact that it is very difficult to obtain registration to practice optometry because of the variety of subjects and their intricacy. This is evident by the small percentage of candidates who are successful in passing. Now the question arises: What opportunity is offered the rejected candidate to obtain practical experience during the interval between examinations. It is difficult for him to secure employment with a registered Optometrist; nor can he practice for himself and issue prescriptions. The State Board examiners have evidently overlooked this fact and have not taken any steps toward enabling candidates to obtain practical experience. There are many rejected candidates who are compelled to work entirely different occupations unless they are willing to apprentice themselves with a registered Optometrist gratis. The only solution to this problem is an Optometric Infirmary.

The fact that a candidate is successful with his examinations doesn't warrant his ability as a refractionist, especially, if he has had no other training further than that which he has secured at school.

The State Board is maintained for the purpose of regulating the practice and protecting the public. By permitting the candidate who has the necessary qualifications, and who successfully passes the State Board examinations to immediately begin his practice, the object of the board defeats its own end.

Psychologically it doesn't concern a patient as to how many theoretical questions the optometrist is able to answer, as long as he performs a satisfactory examination. For, after all, the patient is the Judge, Jury and Executioner. It is very difficult for a beginner to perform an examination more or less satisfactorily, especially in complicated cases, such as: Ciliary Spasm, Mixed Astigmia, Anisometropia, and in cases of Muscular insufficiences, cases which often puzzle old practitioners, unless he is given an opportunity to supplement his school training. This only can be accomplished through an infirmary.

Someone may suggest, "place a recent graduate with a registered Optometrist, and let him obtain his experience there." But wouldn't this arrangement do more harm than good? In the first place it would give some of our "highly commercialized" members of the profession an opportunity to exploit the beginner, as the practicing men will not allow "inexperienced men to handle their patients." Besides, there are not enough "upstairs" Optometrists who would accommodate all beginners, unless the service is offered to them gratis a certain length of time, or if very small remuneration is given. This would force the "new comer" to seek his optical experience in the jewelry store, which in itself would be detrimental to the profession.

A postgraduate infirmary is almost a necessity, as it would:

(1) Increase the practical knowledge of the newly graduate, registered or not.

(2) It would raise the profession to the same standard as the other branches in medicine.

(3) Give the poorer people who cannot afford to see the Optometrist, an opportunity to obtain ocular treatment at the least possible cost at their convenience.

Internship to such an infirmary should be open to graduates from Optometry schools who can qualify for

the State Board, and to registered men. It might be well to have the latter serve in the capacity of supervisors and instructors. This internship should be limited for a period of about three months, so as to enable all those eligible to receive the benefits from the institution. Clinics should be conducted both day and evenings to enable the working class to obtain treatment without loss of time. This occurs in many instances when patients visit eye infirmaries and hospitals. An infirmary would serve as a splendid means toward educating the public regarding Conservation of Vision.

An infirmary is of utmost importance to the profession. In medicine, the hospital is indispensable, for, besides being an institution for medical treatment, it also serves as an experimental laboratory for medical research. The Dental infirmary is largely responsible for the position dentistry is assuming today, as most of the research work is carried on there.

In Optometry the field for research is broad. The infirmary would serve as an excellent medium in which this kind of work could be carried on.

I could cite many more reasons why an infirmary is indispensable, but as the soundness of the proposition outweighs all argument, I will desist.

The future of Optometry depends upon the quality of the men produced, and no man, it matters not how much intellect and education he possesses can be proficient enough when equipped only with an Optometry school education, and no practical experience save that which he has received at school.

I, therefore, trust that in the very near future Optometry will boast of Infirmaries maintained by the profession for the benefit of the public and the profession.

ABSTRACT DEPARTMENT

The General Management of Incipient Cataract of Adult Life. By Luther C. Peter, M. D. Philadelphia, Pennsylvania. Contribution to Opthalmic Science, pp. 163. 1926.

Dr. Peter discusses, at great length, the cause of the onset of senile cataract and the possibility and advisability of instituting treatments that will arrest the development of a cataracous process from going on to maturity. He points out that it is generally accepted by all who made a study of the subject that the development of incipient cataract in the adult is closely related to uveal disease and all its causes, local and constitutional, to refractive errors and to any condition which brings about chronic local congestion and blood stasis. He points out that according to the investigations of Samuel Risley, 70% of the cataract cases he observed were suffering from decided refractive errors. The refractive errors, he thinks, may be the underlying cause of the development of the uvial disturbance. It is believed by many that eye strain leads to the blocking of the vessels of the ciliary body so that malnutrition of the lens follows. Dr. Peters maintains that the first step in an attempted arrest of incipient cataract should be the correction of refractive errors and enforcement of proper rest to relieve any ocular strain which may be present. The claims of some practitioners that they were successful in absorbing or dissolving of lenticular opacities, he maintains, is not well founded, because up to this time, there has not been found any agent which will absorb or dissolve any well-formed opaque striae of the lens.

In cases of unilatral cataract Dr. Peter advises to avoid operation as long as possible, because of the annoyance to the patient from shadows and reflections on the one hand, and the patient's disappointment on the other, at having been obliged to submit to an operation without obtaining useful vision after it was performed. He advises to operate, only, in cases where there is a danger of hypermaturity.

J. I. K.

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OPHTHALMOLOGY AND OPTOMETRY

Ophthalmology and Optometry is the title of an editorial by Edward Jackson in the November issue of the American Journal of Ophthalmology. Doctor Jackson clearly points out the respective weaknesses in the present forms of education for both his own group and that of the optometrist. He also, we regret to say, manages to get in his usual "dig" at us—this time by the sentence,—"the devastating quackery of the short-cut eyesight specialists." This dig we presume aroused one of his and also our readers to such a point that he sent us the following letter, headed "A New Line of Attack" which we reproduce in full, omitting only the names of the parties mentioned and the name of the city, for obvious reasons.

A New Line of Attack

"That the profession of Optometry is making progress, none of its supporters doubt, and additional proof is now with us inasmuch as the so-called Ophthalmologic opposition is now about to attack upon a new front. At least that is the only interpretation that can be taken from Edward Jackson's Editorial—'Ophthalmology or Optometry' in the November issue of the American Journal of Ophthalmology. As he is Editor of this splendid nationally known organ of the Ophthalmologists and is one of the leaders of his group, his words must be listened to, alike by all refractionists.

"In the past, the ophthalmologists have assailed the optometrists on the grounds that our educational qualifications were too elementary. Our courses were too short, and in brief, we, as optometrists, really knew little about the work we were doing. Of course nothing was ever said about the two week to two month post-graduate courses which made medical men into Eye, Ear, Nose and Throat Specialists. Never a word, you may be sure. However, as time went on, the optometric courses were lengthened and broadened until three and four year courses in recognized colleges and universities has become the accepted rule. This naturally takes the wind out of the medical argument on this score.

"Another highly valued form of attack was the mydriatic question. The optometric group, not using the drug, was held up to ridicule—but the public is and has settled this question once and for all. It doesn't want to be doped and won't be doped inasmuch as it has found that splendid results can be obtained without the bother of submitting to it.

"A third and rather pleasant form of 'automatic-back-patting,' frequently resorted to in attacking the optometric group, is the assertion that patients suffering from symptoms such as headaches, nausea and vertigo, need treatments—or at least an examination by an ophthalmologist, because of his superior training! This is all pure ROT—and even medical men smile when it is 'pulled.' In the first place, it is generally acknowledged among medical men and the writer numbers four in his immediate family, that

many physicians who cannot make a living with a general pracice go into Ophthalmology. Of course, there are some outstanding exceptions to this but in the main it is LARGELY true. Therefore, the Ophthalmologists cannot truthfully pat themselves on the back as far as their medical success is concerned. Furthermore—what do they know about headaches—vertigo or nausea, that isn't common knowledge? What were they taught on these subjects that wasn't taught in optometric colleges ten years ago? A case to the point:—A patient suffering with headaches, called at the office of an Optometrist. After refracting the case a diagnosis was made of Hypermetropia —some two dioptres and glasses were prescribed. These afforded her no relief and after some 'pow-wowing around' the case was referred to a certain Dr. X. Now Dr. X is an Ophthalomlogist of some standing in his city. He is a fellow of the American College of Surgeons, a fellow of the American Academy of Ophthalmology, has written much for Ophthalmologic literature, has served as president of his local academy of ophthalmology and in general conducts himself as 'some pumpkins' although as a matter of fact he is largely supported by cases referred to him by optometrists. And what does he do? He fiddles around for 90 days —changes lenses—tries this and that and finally in desperation the patient who had been going to him nearly every other day for 'treatment' during this period, tore herself away and reported to a Dr. W, an internal medical specialist in one of the large clinics. This practitioner diagnosed the case within 24 hours and almost immediately gave the patient relief. Of course, it might be said that had the Optometrist been medically trained, he would never have prescribed the lenses but would have at once located the seat of the trouble as did Dr. W—but somehow the argument sounds rather weak after the performance of the medically trained Dr. X. So much for the great 'I AM' of the Ophthalmological Educational Boasts.

"These three favorite forms of mud-slinging are beginning to fail for the reasons mentioned and in desperation Editor Jackson reaches out for a new weapon and finds it in this, judging from the editorial previously mentioned: First, we, as optometrists, have been over zealous in pushing the educational work in our optometric courses—which have now become lop-sided—there being—says Dr. Jackson, too much physics —'math'—etc.,—no longer are we under-educated—not at all—now we suddenly become over-educated (on some subjects)—a terrible thing, something, it seems, must be done about it at once although he fails to state just what. And second, we have too little knowledge of things medical to go about pretending we have a medical training. Here is the new line of attack—a lop-sided education—too much and not enough, and now we are supposed to be pretending to be medical men—Heaven forbid! In many respects medicine has always been the most gigantic guessing contest ever devised by the mind of man, and we shudder to think of any optometrist pretending he is medically trained. We are optometrists flying under our optometric colors—not medical colors—you may be sure, and we are proud of the fact that we are optometrists. A New Line of Attack—It is to laugh!"

Of course the writer of the above has gone too far in making some of his accusations. Much farther indeed than the staff of this Journal would be willing to go, yet there is a good deal of truth in his statements and a careful study of these by the ophthalmologic group we believe is in order as we are sure they have spent far too much time worrying over optometric matters and not enough in developing the technic of their own speciality.

Regarding Doctor Jackson's editorial, two paragraphs stand out as a first class review of the present situation and we reproduce them in full as follows:

"Before Donders and Helmholtz, very few physicians had any practical acquaintance with optics, and very few opticians had any practical acquaintance with the diagnosis of disease. Since that time a great deal of energy on both sides has been expended in claiming, for each, that the prescribing of lenses was his own prerogative, and in keeping the other party from doing it, without fully preparing themselves to perform this function to the best advantage of the community. Medical schools have given some instruction in optics, but not nearly enough to fit physicians to care for the optical needs of the community; and optometrists have tried to learn a little about the eye and its diseases, but were generally content with only such a smattering, as might enable them to pretend medical learning.

"But these attempts have not settled, and will not settle, who should prescribe glasses. That will be decided only when medical schools give, and physicians take, adequate instruction in optics, in relation to physiology and pathology; or when optometrists understand that they can build up a profession similar to that of dentistry, only if they include in their training for it, the fundamental branches of a medical education. On both sides there have been individuals who saw that the needs of modern students included more ophthalmic study and teaching than had yet been offered for them. But physicians who knew nothing of optics have dominated the medical schools; and physicists and mechanics who knew nothing of pathology and diagnosis have controlled the teaching, and legislative panaceas have secured the largest following among the optometrists."

We may say in reply to this editorial, Doctor Jackson, that we are trying to do precisely the things you suggest. We do not wish nor do we believe it necessary, that an optometrist be also a physician, any more

than it is necessary to hold an M. D. degree to be a successful dentist. You say that we can build up a successful profession only when we include in our courses the fundamentals now taught to dentists. These Doctor Jackson are now being added just as fast as posible and you may rest assured that well balanced optometric courses are our objective and our ideal. Optometrists as a group recognize the need for a broad and thorough training and are striving to include such courses in our schools as will assure the oncoming men this type of training. We may also say that were it not for constant medical opposition, such courses giving a broader training could and would be added more quickly. For instance, at the Rochester School of Optometry, physicians in that city were forbidden to lecture before the optometric student body, probably by their local Medical Society, and later an osteopath was warned that should he continue to do so that every hospital in Rochester would be closed to him. And again, at the Ohio State University, the Medical School refused the School of Applied Optics these very things of which you speak while at the same time offering them to dental students. This all happening under one broad University roof where the public welfare is supposed to be a thing of interest, and where knowledge is supposed to be above the petty material jealousies.

Educational Progress is being made in our optometric schools. The next ten years will see a development in optometric education which will please all those genuinely interested in the public welfare. And while we are constantly increasing our educational requirements (even to a point of being accused of becoming over-educated) and thereby protect the public by keeping out the unfit from coming into our ranks we would like to ask Dr. Jackson to tell us what ophthalmology is doing to keep the unfit out of their ranks. What education in optics is compulsory for the general practitioner or the intern to acquire before he is permitted to practice refraction?

C. C. K.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

STATE EDITORS

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Reports of Society Proceedings in Delaware should be sent to Dr. M. Burton Meyer, 101 West Eighth St., Wilmington; in Iowa to Dr. D. A. Kinney, Charles City; in Maryland to Dr. J. F. Andreae, Baltimore; in Minnesota to Dr. J. A. Large, Winona; in Nebraska to Dr. C. A. Perrigo, Freemont; in North Dakota to Dr. A. S. Anderson, Williston; in Oklahoma to Dr. E. B. Alexander, Duncan, and in Vermont to Dr. L. P. Folsom, So. Royalton.

WALTER G. KING ELECTED PRESIDENT OF THE NATIONAL SAFETY COUNCIL

Walter G. King, of American Optical Company, has been signally honored by his associates in the field of head and eye protection. The National Safety Council, a nationwide group of industrial safety experts, has elected him their president at the annual conference held in Detroit through the last week of October.

This recognition of Mr. King's ability in safety work and tribute to his forceful character reflects credit to him and to his associates. Mr. King, probably the originator of the finest goggles in industry, has for many years been a dominant figure in the field of safety, where he and his assistants have ably provided against intricate problems of eye protection from flying particles of metal, from dust, from gas, from heat and from light, with specially constructed goggles and masks.

PRESIDENT OF MINNESOTA ASSOCIATION INJURED

It is with deep regret that we report the recent injuries received by Dr. A. H. Nordland, President of the Minnesota Association of Optometrists. Dr. Nordland was assisting in hanging a storm-window on the second floor of his home when the ladder upon which he was standing broke, dropping him two floors to the concrete driveway. Both his arms were broken. We sincerely hope he is now well on the road to a successful recovery.

AMERICAN ACADEMY OF OPTOMETRY

The next meeting of the Academy will be held on December 5th, 6th and 7th. We have received an invitation from the Bureau of Standards at Washington to meet in their rooms and they promise generous co-operation of any part of their plant which may interest us. A good turnout of members is expected.

VERMONT EXAMINATIONS AND PROPOSED OPTOMETRY LAW

At the coming legislature several changes in the present Optometry Law will be presented. Since the nature of the changes is such that they should merit the approval of all members of the state association as well as the citizens whom they serve, it is expected that all members will communicate with the members of the legislature who go from their vicinity and urge them to give the bill favorable consideration. Prompt action on this is imperative.

The proposed bill will provide for conditions which have arisen since the enactment of the original law in 1909 and will enable the board to cope with violators who now evade the present law because of its technical weaknesses. Briefly the changes are—a new definition which is "bullet-proof," the raising of the standard of requirements of applicants to the equal of the average of other states, the prohibiting of house-to-house peddling (branch offices will be permitted), a clause covering reciprocity will be added and a clause regulating the sale of glazed goods by resident merchants.

Many of our optometrists registered by exemption and who have kept abreast of the times by study and attendance at the clinics held by the state association have expressed a wish to take a standard examination and become registered by examination and thus obtain the reciprocity privileges. A standard optometry examination for these men will be given early in December, 1926. Applications should be in the hands of the secretary of the board not later than December 1st, 1926.

DR. L. P. FOLSOM,
Secretary.

DELAWARE ASSOCIATION

The monthly meeting of the Delaware State Optometric Association was held at Milford, Thursday, November 11th. The attendance was good, only two absent, and as we have every ethical practitioner in good standing on our list of members, we are more than happy over the enthusiasm shown.

The matter of having the Skeffington Clinic in Wilmington some time in February was discussed and favorably voted on. Wilmington practitioners are unanimously for it, but the men from distant cities seem to think that it is too much to close their offices, at that time of year, for a full week.

A committee was appointed to attend the session of the Safety Council held at the State Capitol, Dover. There will be presented at the next session of our legislature several bills sponsored by the Safety Council providing for measures giving better protection to pedestrians and motor drivers. One bill provides for physical examination and the optometrists are watching it carefully, as it means eye examinations.

The co-operative advertising that we have been conducting for the past four months was heartily endorsed and ordered to be continued indefinitely. This is a most interesting venture as we are able to cover our entire state, reaching approximately a hundred thousand people, at a cost of about two dollars a month for each ethical optometrist. We use small space on the editorial page of our daily newspaper, appearing once a week, the paper giving us very special consideration in the matter of position. Every Wednesday evening the message of Professional Optometry is presented to more than half the people of the state. We feel that we are laying a substantial foundation for the future.

Meetings are held monthly; usually a paper is read by one of our own members, but sometimes President McKee leads in a general discussion of the problems of the day. Visitors are always welcome. If an optometrist wanders down here along about the second Thursday of the month we'll be glad to demonstrate Delaware hospitality.

DR. M. BURTON MEYER.

MINNEAPOLIS OPTOMETRIC SOCIETY TO CONDUCT EYESIGHT CONSERVATION CAMPAIGN

At the last meeting of the Minneapolis Optometric Society it was unanimously decided to carry on an educational eyesight conservation campaign. Dr. J. I. Kurtz, who was appointed chairman of the speakers committee, presented a plan to carry out the campaign. The plan includes the organizing and training of a group of speakers to deliver illustrated lectures in schools and before various organizations. All members who wish to join the public speaking class are asked to communicate with Dr. Kurtz.

It was also decided to organize a study club. Dr. DeMars was appointed chairman of the Study Club and is busy now laying out a study plan for the year, which will include reading of original papers and reviewing of the latest books on ocular science.

NOTICE

The entire profession has now received our announcement of the coming course in Visual Survey and Service. Applications are coming in from all over the country. The first mail brought in such names as Dr. Watts, Ex-President of the New York State Association, and Dr. Todd, Ex-President of the National Association. We are more than pleased with these early returns.

In order, however, that the greatest number may be enrolled in time for the regular distribution of the lessons, we are again calling the course to the attention of those from whom we have not yet heard.

You will be interested to know that our Service Department will be operated upon certain definite principles of which the following will concern you most.

1. Our Service Department will sell the advantages and necessity of Visual Survey and Service to Industry and contract for this Service on an annual basis.

2. The Survey will comprise an objective and subjective test according to our standards, a report to the employer of findings, and further complete examination of the employee followed by such service as will remedy each case.

3. This Service to Industry will be on an annual basis with the cost of this Service to Industry depending upon the number of employees.

4. This Service is to be rendered by local practitioners who have qualified under our course and practice according to ethical and professional standards. The work to be apportioned by us among this class as our work and the enlistment of industries develop.

5. Practitioners to be compensated monthly by us on a per capita basis. Your remuneration will be professionally adequate.

6. All professional work to be kept wholly separate and distinct from the merchandising service.

If you have not already enrolled, fill out the application which you have already received and return the same with your check and notes.

Eyesight Survey and Service Corporation

1014-1019 Union Trust Building

Rochester, N. Y.

End

Say: I saw it in the American Journal of Optometry